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The Brantford Fluorine Experiment

INTERIM REPORT AFTER FIVE YEARS OF WATER FLUORIDATION

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TWO publications from the American Association for the Advancement of Science (1, 2) in 1942 first focussed the attention of the scientific world on the possibility of reducing the incidence of dental caries by the addition of a fluoride compound to a public water supply.

On August 19, 1942, a special meeting of the Board of Health was held (3) to discuss the appalling dental caries among Brantford school children. The School Dental Officer led the discussion of this important subject, and among those present was the Acting Director of Dental Services, Provincial Department of Health. At this time the proposal was first made that Brantford embark on a fluorine experiment, and it was decided to seek the co-operation of the Provincial Department of Health, in order that a control city might be arranged for and all the conditions of valid scientific research complied with.

With the co-operation of the Provincial Department of Health it was soon determined that Brantford could not be listed among those fortunate communities with a natural fluoride content in the public water, as the Grand River, from which the city draws its water, contains the merest trace of fluorides. As a result of an educational campaign, a strong public demand developed for the application of fluorine to the public water supply as a method of counteracting tooth decay among children. The proposal had the approval of the local dental and medical societies, the two boards of education, the Board of Trade, Rotary, Kiwanis and other service clubs, labor unions and the City Council.

It was recognized that fluorine in the public water supply was not a proven method for the prevention of dental caries, and that it might take ten years to prove or disprove its preventive value.

The financial and scientific support of the Department of Health was sought by the municipal authorities. The Department gave its approval to the project and provided the technical assistance of Dr. A. E. Berry in the application of sodium fluoride to the Brantford water supply.

As these negotiations consumed much valuable time, it was not until 1944 that the Public Utilities Commission agreed to apply the fluoride to the city water supply and to pay the cost of the chemicals. A further delay was occasioned by the difficulty of securing suitable equipment for applying sodium fluoride to the water.

On June 20, 1945, sodium fluoride was first applied to Brantford city water. This application has since been continued night and day.

The Brantford schools' dental clinic, a health service which had been functioning for some thirty years, lost most of its equipment in a school fire during 1944. The school dental officer and his assistant seized the opportunity to obtain the first D.M.F. rate for Brantford school children. D.M.F. means *diseased teeth*—those with present decay; *missing teeth*—those which have been extracted; and *filled teeth*—those with cavities restored by fillings. A dental survey of all school children was made. The dental-caries experience of each child was recorded on an individual card. The children were examined by the mouth mirror and sharp explorer method.

A second dental survey of all school children was made in the spring of 1945 before the fluoridation of the water supply. The results of these two surveys have been combined and are shown in Table I.

TABLE I

COMBINED SURVEYS OF BRANTFORD SCHOOL CHILDREN (CONTINUOUS RESIDENTS ONLY), 1944 AND 1945

PRE-FLUORINE SURVEYS

Age	*No. of Children*	*No. with D.M.F.'s**	*No. of D.M.F.'s*			*D.M.F.'s per child*
			Permanent	*Deciduous*	*Total*	
5	318	261	33	1793	1826	5.74
6	556	489	223	3692	3915	7.04
7	616	573	1023	4177	5200	8.44
8	614	579	1499	3931	5430	8.84
9	608	595	1936	3403	5339	8.78
10	565	546	2148	2119	4267	7.55
11	604	585	2829	1054	3883	6.42
12	658	648	4151	416	4567	6.94
13	531	514	4132	107	4239	7.98
14	307	305	2639	24	2663	8.67
15 & 16	105	103	1044	4	1048	9.98
Total	5,482	5,198	21,657	20,720	42,377	7.73
Total 12-14	1,496	1,467	10,922	547	11,469	7.66

*D.M.F.: *diseased teeth*—those with present decay; *missing teeth*—those which have been extracted; and *filled teeth*—those with cavities restored by fillings.

The first post-fluorine dental survey was made in the fall of 1946, after seventeen months of exposure to fluoridated water. The results are given in Table II.

TABLE II

FIRST POST-FLUORINE SURVEY, BRANTFORD SCHOOL CHILDREN, 1946

Age	*No. of Children*	*No. with D.M.F.'s*	*No. of D.M.F.'s*			*D.M.F.'s per child*
			Permanent	*Deciduous*	*Total*	
5	360	259	23	1482	1505	4.18
6	342	279	170	1961	2131	6.23
7	290	276	532	1866	2398	8.26
8	278	271	766	1812	2578	9.27
9	283	278	981	1603	2584	9.13
10	301	297	1276	1234	2510	8.33
11	274	273	1348	628	1976	7.21
12	258	255	1631	215	1846	7.17
13	236	234	1873	71	1944	8.23
14	117	117	1108	20	1128	9.64
15 & 16	48	48	466	—	466	9.70
Total	2,787	2,587	10,174	10,892	21,066	7.55
Total 12-14	611	606	4,612	306	4,918	8.04

The second and succeeding post-fluorine dental surveys were made at twelve-month intervals. All were made by the same dental officer, using the same methods and procedure.

The tables record the dental condition of children who were born in Brantford and have lived here all their lives. Permanent and deciduous teeth are recorded separately.

TABLE III

SECOND POST-FLUORINE SURVEY, BRANTFORD SCHOOL CHILDREN, 1947

Age	*No. of Children*	*No. with D.M.F.'s*	*No. of D.M.F.'s*			*D.M.F.'s per child*
			Permanent	*Deciduous*	*Total*	
5	302	210	8	1241	1249	4.13
6	347	267	90	1700	1790	5.16
7	332	298	333	2039	2372	7.14
8	263	255	609	1684	2293	8.72
9	262	251	734	1429	2163	8.25
10	280	272	1044	1055	2099	7.46
11	292	286	1376	572	1948	6.67
12	264	260	1545	221	1766	6.69
13	239	231	1677	56	1733	7.25
14	122	121	1034	14	1048	8.59
15 & 16	48	46	458	1	459	9.56
Total	2,751	2,497	8,908	10,012	18,920	6.87
Total 12-14	625	612	4,256	291	4,547	7.27

TABLE IV

THIRD POST-FLUORINE SURVEY, BRANTFORD SCHOOL CHILDREN, 1948

Age	*No. of Children*	*No. with D.M.F.'s*	*No. of D.M.F.'s*			*D.M.F.'s per child*
			Permanent	*Deciduous*	*Total*	
5	370	227	7	1102	1109	2.97
6	399	311	100	1885	1985	4.97
7	350	297	260	1805	2065	5.61
8	323	296	538	1918	2456	7.60
9	258	247	696	1325	2021	7.83
10	237	229	769	856	1625	6.85
11	268	256	1106	519	1625	6.06
12	286	280	1600	199	1799	6.29
13	227	224	1475	112	1587	6.99
14	103	99	686	23	709	6.88
15 & 16	42	41	350	2	352	8.38
Total	2,863	2,507	7,587	9,746	17,333	6.05
Total 12-14	616	603	3,761	334	4,095	6.64

TABLE V

FOURTH POST-FLUORINE SURVEY, BRANTFORD SCHOOL CHILDREN, 1949

Age	*No. of Children*	*No. with D.M.F.'s*	*No. of D.M.F.'s*			*D.M.F.'s per child*
			Permanent	*Deciduous*	*Total*	
5	290	179	16	901	917	3.16
6	411	277	59	1467	1526	3.72
7	382	328	286	1940	2226	5.83
8	327	293	449	1724	2173	6.61
9	313	294	683	1595	2278	7.28
10	250	239	789	971	1760	7.04
11	238	225	890	452	1342	5.64
12	255	246	1276	199	1475	5.76
13	263	255	1699	74	1773	6.74
14	104	100	728	24	752	7.23
15 & 16	37	36	297	6	303	8.19
Total	2,870	2,472	7,172	9,353	16,525	5.75
Total 12-14	622	601	3,703	297	4,000	6.43

Table VII summarizes the changes which have taken place in the dental-caries experience of Brantford school children over the five-year period during which fluorine has been added to the municipal water supply.

Table VIII gives the numbers and percentages of children with perfect teeth from 1945 to 1950.

These tables are presumptive evidence of the value of fluoridated water in the prevention of dental caries. They are presented in this interim report, in justice to the people of Brantford, who are entitled to know to what end they have so splendidly supported the fluorine experiment.

TABLE VI

FIFTH POST-FLUORINE SURVEY, BRANTFORD SCHOOL CHILDREN, 1950

Age	*No. of Children*	*No. with D.M.F.'s*	*No. of D.M.F.'s*			*D.M.F.'s per child*
			Permanent	*Deciduous*	*Total*	
5	310	168	3	809	812	2.62
6	334	233	20	1303	1323	3.96
7	390	305	197	1592	1789	4.58
8	368	328	482	1948	2430	6.60
9	313	285	570	1482	2052	6.51
10	296	275	775	1041	1816	6.14
11	243	237	854	530	1384	5.69
12	220	202	943	154	1097	4.98
13	241	236	1343	75	1418	5.88
14	119	118	893	9	902	7.57
15 & 16	39	37	284	6	290	7.44
Total	2,873	2,424	6,364	8,949	15,313	5.32
Total 12-14	580	556	3,179	238	3,417	5.89

TABLE VII

CHANGES IN THE DENTAL-CARIES EXPERIENCE OF BRANTFORD SCHOOL CHILDREN, 1944-1950

	Pre-Fluoridation	*Post-Fluoridation*					*%*
Age	*1944 & 1945*	*1946*	*1947*	*1948*	*1949*	*1950*	*Reduction*
5	5.74	4.18	4.13	2.97	3.16	2.62	54 %
6	7.04	6.23	5.16	4.97	3.72	3.96	43 %
7	8.44	8.26	7.14	5.61	5.83	4.58	45 %
8	8.84	9.27	8.72	7.60	6.61	6.60	20 %
9	8.78	9.13	8.25	7.83	7.28	6.51	26 %
10	7.55	8.33	7.46	6.85	7.04	6.14	18 %
11	6.42	7.21	6.67	6.06	5.64	5.69	11 %
12	6.94	7.17	6.69	6.29	5.76	4.98	28 %
13	7.98	8.23	7.25	6.99	6.74	5.88	26 %
14	8.67	9.64	8.59	6.88	7.23	7.57	12 %
15 & 16	9.98	9.70	9.56	8.38	8.19	7.44	25 %
Total	7.73	7.55	6.87	6.05	5.75	5.32	31 %

TABLE VIII

YEARLY PERCENTAGES OF BRANTFORD SCHOOL CHILDREN WITH PERFECT TEETH, 1944-1950

Year	*Number of Pupils*	*Having Perfect Teeth*	
Pre-fluoridation			
1944 and 1945	5,482	284	5.18
Post-fluoridation			
1946	2,787	200	7.17
1947	2,751	254	9.23
1948	2,863	356	12.44
1949	2,870	398	13.86
1950	2,873	449	15.63

Application and Control Data

Sodium fluoride is introduced to Brantford city water by a Novadel Agene dry-feed machine, designed to feed vitamin B1 to moving belts conveying flour. It is essentially volumetric in principle, depending on dry material being withdrawn from a hopper by means of a roller. Gross adjustments may be made by changing pulley sizes. Fine adjustment is achieved by controlling the size of the ribbon of fluoride, stripping off the roll by means of a calibrated slide device. Originally the machine was equipped with a solution pot so that the dry fluoride dropped into a constantly moving stream of water which, by means of a rubber hose, was directed to the influent flume to the filters.

Laboratory observation showed that the varying alum dose used to clarify the water affected fluoridation adversely. The point of feeding was therefore changed to the clear well, following filtration, where great turbulence readily disperses the fluoride and long contact in a baffled reservoir assures uniform solution.

As a result of these changes, the solution pot was dispensed with. A gravimetric type of feeder is now available, and would be preferable to the machine now in use in Brantford.

Sodium fluoride was obtained originally from the United States, but prices increased from 12.89 cents up to 17.84 cents per pound, causing us to purchase Canadian-made material at 12.6 cents per pound.

Silicofluoride is a possible alternative to sodium fluoride. Its cost is much lower, 5.95 cents per pound, and its fluoride content is much higher, 60.5 per cent as against 48.5 per cent for sodium fluoride. However, the Brantford Fluorine Committee decided that, as the experiment was started with sodium fluoride, no change should be made.

The fluoride content of Brantford water is determined by the procedure outlined in the ninth edition of "Standard Methods" (4). Operators, when making routine control tests for chlorine, also take a small sample for fluoride analysis. At the end of twenty-four hours the plant laboratory therefore is provided with a composite sample composed of twenty-four small samples. Since samples contain chloramine, which precludes accuracy in fluoride determination, this condition is overcome by treating samples and standards alike with one drop each of 10 per cent sodium thiosulphate. The reason for the use of thiosulphate has recently been discussed in detail by Taras, Cisco and Garnell (5).

It was initially intended to apply the fluoride so as to produce 1 p.p.m. fluoride ion in the finished water, this requiring the addition of 23.3 pounds of sodium fluoride (approximately 95 per cent pure) to 1 Imperial M.G.T. (Imperial gallon—10 pounds). Finally, as a result of a discussion at a meeting of the Brantford Fluorine Committee held on February 15, 1949, the dosage was raised to produce 1.20 p.p.m. fluoride ion in finished water. We, therefore, feed 28 pounds of sodium fluoride per million Imperial gallons.

The cost of adding fluoride to Brantford water has varied due to changing source of supply of the fluoride. In 1948 the cost for fluoride was $5,899 for an assumed consumer population of 35,000, giving a figure of 17 cents per capita.

In 1949 costs dropped to $5,030 for an assumed consumer population of 40,000, giving a per capita cost of 12.6 cents, which may be low.

This interim report is purely a record of local studies. It is a matter for profound satisfaction that in 1948 the Department of National Health and Welfare became interested in the Brantford fluorine experiment. As a result, Dr. H. K. Brown, Chief Dental Officer, undertook a long-range comparative study of dental conditions in Stratford, Sarnia and Brantford, which in the course of years should yield valuable data and valid conclusions. It is also gratefully acknowledged that in 1949 the Ontario Department of Health became a financial partner by contributing to meet the higher costs of the chemicals used.

REFERENCES

1. Dean, H. T.: Fluorine and Dental Health, A.A.A.S. Bull., vol. 1, no. 6, August 1942.
2. Moulton, F. R., ed.: Fluorine and Dental Health, Publication No. 19, Science Press, 1942.
3. Brantford Expositor, August 20, 1942.
4. Standard Methods for the Analysis of Water and Sewage. New York: American Public Health Association, 9th ed., 1946.
5. Taras, M. J., Cisco, H. D., and Garnell, M.: Interferences in Alizarin Method of Fluoride Determination, J. Am. Water Works A., 1950, *42*:583.

Breast Cancer: The Fallacy of Comparison of Dissimilar Groups in Appraising Treatment

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IN a recent essay (1) on the treatment of breast cancer, the authors gauge their success, apart from the mental and physical relief afforded the patients, by comparing their five-year survivals with the five-year survivals in 100 untreated cases as reported by Daland (2). Daland found that 22 per cent of his untreated cases survived five years or longer after the alleged first appearance of the lesion; these authors found that 43-46 per cent of their cases survived free from clinical evidence of disease five years or more after beginning of treatment. Thus the basis of their calculation of about 100 per cent increase in survivals appears a very conservative one. However, it requires examination.

As Daland emphasized, "If one is to determine the value of operative or radiation therapy for cancer of the breast, it is necessary that he should study a group of similar cases which have not been subjected to any treatment." If the treated and untreated series were not similar in their constitution, one containing different types or different proportions of corresponding types of cases from the other, allowance would have to be made for such differences; otherwise comparison would not be valid and deductions drawn from such an invalid comparison would be similarly invalid. Serious consideration must, therefore, be given to the similarity or dissimilarity of the two series in so far as types of cases are concerned.

The Untreated Series

Daland briefly describes his cases, their selection, source and course, as follows:

> One hundred cases were selected from the records of the Collis P. Huntington Hospital and the House of the Good Samaritan, Boston. There were 79 cases from the former and 21 from the latter. None of these patients, as far as we could learn, had received any treatment for the cancer, either operation, radium or X-ray. There were 98 women and 2 men in the series.
>
> All data collected go back to the date of observation of the tumor and not to the time of examination. The histories of these patients are by no means complete. The House of the Good Samaritan is a hospital which cares for patients in the terminal stages of the disease. It is difficult to secure adequate data from such patients as to the exact time of onset or the date on which they were first examined. Similarly, it is difficult to tell in what portion of the breast the cancer originated or the early course of the disease.
>
> At the Collis P. Huntington Hospital patients are seen in all stages of the disease. When the hospital was first opened a certain number of patients were admitted for chronic care and stayed in the hospital until death. At the present time large numbers of patients

come early enough to be referred for operation elsewhere. Patients are also seen in the late stages but are not admitted to the hospital for chronic care. Data on many cases must be secured by social workers or obtained from city clerks, so that we do not know what happens during the late stages of the disease.

Operability. We have definite statements in the records of 23 patients that operation was advised, that is, the cancer was recognized early enough to warrant an attempt at radical cure. In every case operation was refused. There were 3 others in whom the general condition of the patient did not warrant operation. Twenty-three (23 per cent) were inoperable when they were first examined. . . .

Duration of life from onset of disease.

. . . the deaths begin as early as 3 months and occur rather rapidly. Twenty-one per cent die the first year, 20 per cent in the second and 19 per cent in the third, so that there are 40 per cent alive with cancer at the end of 3 years. Ten per cent die in the next year, and 8 in the next, leaving 22 per cent who live 5 years without any treatment whatsoever. In the sixth year another 8 per cent die and 5 per cent in the following year. At the end of 10 years 5 patients (5 per cent) were still alive. These 5 died at the end of 10¼, 10¼, 11⅝, 13, and 13 years respectively.

One case of interest has been omitted because the patient is still alive. She gave a history of a tumor of the breast, probably cancer, of 35.5 years' duration. Of course we may say that this was not cancer and possibly it was not. However, she was examined in 1914 by Dr. Greenough, who noted that it was inoperable and that it was probably scirrhous in type. The entire breast had been destroyed at that time. The patient is now 80 years old (2).

Although the criteria for diagnosis and selection of Daland's cases are not given in detail, it is plain that they were rigidly exclusive of any lesion that was not unmistakably clinically cancer and even of any lesion that was not proven fatal by its course. Living instead of dying, in spite of the presence of what was practically undoubtedly cancer of 35.5 years' duration with such extensive destructive effects that it was declared inoperable thirteen years before the report was written, had excluded one case. It is plain from the description of their sources and their course that all the cases sought attention for their condition, that most of them were not just cognizant of a lump but were actually suffering from cancer, that many were in advanced states of the disease and that some were even in a near-terminal condition when first seen. Although Daland does not give the criteria of operability, there is no reason to think that the 23 cases for whom there was definite evidence that operation had been advised but refused lacked crucial clinical characteristics for cancer diagnosis. These 23 all died with an average duration of 42.5 months while the 23 adjudged inoperable when first seen died with an average duration of 29 months from the first stated notice of the tumour. (The difference between the average alleged durations of these two groups of 23 cases each, without any treatment in either, is to be noticed.)

The Treated Series, The Difference and Significance

The diagnosis and selection of the treated cases are from a different approach. "I would merely reiterate," one of the authors says in 1949, "that nearly all the classical findings, save one, the presence of a lump, may be absent and that no lump should be left undisturbed or kept long under observation, the exact nature of which has not been proved" (3). The contrast in the clinical assessment is so immediately obvious that it might as quickly cast suspicion on the similarity of the two series.

TABLE I

BREAST CANCER
CLASSIFICATION, DISTRIBUTION AND 5-YEAR SURVIVALS*

Criteria	Number in Stage	5-Year Survivals*	
		No.	%
STAGE I: Skin —not involved. Tumour —localized in breast, movable, less than 3 cm. in diameter. Metastases—none in axillary lymph nodes or elsewhere.	58	47 (4)[z]	81
STAGE II: Skin —not involved Tumour —localized in breast, movable, less than 6 cm. in diameter. Metastases—few axillary lymph nodes involved; no other metastases.	48	26 (4)[z]	54
STAGE III: Skin —attached, fixed but not obviously invaded; nipple retraction. Tumour —localized in breast; more than 6 cm. in diameter; may be attached to fascia but not fixed to chest wall. Metastases—may or may not be involvement of a few axillary lymph nodes.	142	59 (5)[z]	42
STAGE IV: Skin —oedema or induration, or ulceration or local skin nodules or acute inflammation. Tumour —diffuse infiltration, or fixation to chest wall or oedema of breast. Metastases—axillary lymph nodes extensively involved or fixed; no clinical or roentgenological evidences of distant metastases.	52	6 (2)[z]	12
STAGE V: Skin —as in any preceding stage or with nodules beyond the periphery of the breast. Tumour —as in any other stage. Metastases—extensive invasion of axillary lymph node, or supraclavicular lymph node involvement or clinical or roentgenological evidences of distant metastases.	24	1	4
ALL STAGES	324	139 (15)[z]	43

NOTE: All estimations of diameter refer to the clinical measurement which is approximately twice the diameter of the pathological specimen. The lesion may become that of a later stage by a change in relation to the skin, or by a change of the tumour itself or by metastases.
*Free from clinical evidence of disease 5 years after beginning of treatment.
( )[z] untraced included among deceased.

The criteria of classification, the distribution of the treated cases and the survivals are shown in Table I, constructed from the data of the original essay. There is no doubt that the cases in Stage V were, by and large, fundamentally similar to those in Daland's series. So, too, those in Stage IV. It is probable, too, that the larger part of those in Stage III were also similar, but for many of Stage II and for most of Stage I there is reason to question the similarity. The absence of any lymphatic involvement, of any evident invasion of the skin, of

fixation, or nipple retraction, etc., indicates that the diagnosis in a proportion of these cases must have been made largely on morphology. But Bloodgood (no less) long ago pointed out the unreliability of morphology as a basis for diagnosis of borderline lesions. After presenting evidence that, at the Johns Hopkins clinic, the proportion of such lesions had increased between 1910 and 1920 following the educational efforts of the American Society for the Control of Cancer, he says:

> The third difficulty is the interpretation of the immediate frozen section. In spite of the best technic in making these sections, and in spite of the fact that they are first examined by the most experienced in pathologic conditions of the breast I have found that if these sections, or other permanent sections, are submitted to a number of men equally experienced in the microscopic diagnosis of breast lesions, there is an increasing number of cases in the group which I have just discussed under the heading of benign lumps, diagnosed cancer or suspicious of cancer.
>
> When one submits sections of undoubted cancer of the breast to the same pathologists, there is never any difference of opinion as to the malignancy. When one submits distinctly benign encapsulated adenoma and distinctly benign chronic cystic mastitis and the other types of benign lesions of the breast to the same group of pathologists, there is rarely any difference of opinion as to the benignancy.
>
> This borderline group, at least at the present time and as far as my personal observations go, is increasing.
>
> When anyone feels certain of his diagnosis in this borderline group, that certainty should disappear when he submits the sections to his colleagues and finds disagreement.
>
> Therefore, we must face the facts that there will be increasing difficulties in the diagnosis of breast lesions, both at the examination and at the exploratory incision, and for this reason for the benefit of our patients, there must be a working rule.

He also adds:

> It is important for all surgeons to remember and for the public to know that in the large clinics of this country and in many of the smaller where both the surgeon and the pathologist are experienced, this mistake of performing the complete operation for lesions that are not malignant takes place in a varying percentage of cases. Some of these clinics may be unaware of this. If so, their percentage of cures of cancer will be greater. But should they submit sections of this borderline group of tumors to their colleagues, they will find, as I and others have found, that the diagnosis of malignancy will not be subscribed to by a varying percentage of consultants. (4)

The years since 1923 have not brought any solution of the difficulties. But, as shown previously (5, 6), there is today common recognition by pathologists, and some clinicians, of the inadequacies of morphology as a basis for diagnosis of borderline lesions—lesions at the "indefinite margins". And, undoubtedly, the continued urge to "get cancer early" has provided, as clearly foreseen by Bloodgood, progressively increasing opportunity for the inclusion of "false positives" or lesions of very low or no lethal potentiality, not in Stage I only but also, though to a lesser extent, in Stage II and even in Stage III, and, consequently, as also foreseen by Bloodgood, for reports of higher cancer-cure ratios.

There is, then, the further incriminating evidence: the fact that the treatment and cure of such cases in varying proportions of the total breast cancer treated, from little or none to very considerable, in different places (in the various provinces of Canada, in Massachusetts and in England and Wales) and over shorter or longer periods, has not effected in any of those places any reduction in recorded breast cancer mortality; in other words, the fact that identical

level trends of that mortality have been maintained whether or not conditions were propitious for the inclusion of such cases and whether or not they constitute an insignificant part or a very considerable and increasing proportion of all treated cases (7, 8). This evidence not only demonstrates and confirms the hazard of diagnosis of borderline cases, as emphasized by pathologists (6), but in itself indicates, warrants and requires the conclusion that the shift to and the increase in the proportion of so-called "early" cases over the past two or three decades has, in general, included a very large proportion of lesions of very low or no lethal potentiality. Then the fact that the 81 per cent 5-year clinical cures in the Stage I cases in the treated series is the percentage commonly found for Stage I cases—and, indeed, the same as was established well over 30 years ago for lesions proven to be without axillary involvement (9)—shows that the Stage I cases in the treated series are quite similar to other Stage I cases the inclusion and cure of which has failed to reduce recorded cancer mortality. Therefore, there is no reasonable ground for assuming that the Stage I cases in the treated series, or the treated series as a whole, are different from or contain any smaller proportion of lowly lethal lesions than does the general run of cases reported in recent years.

Thus, the inclusion of such cases in the treated series makes that series quite different from the untreated controls. The dissimilarity renders comparison of the two series invalid and the deductions drawn from that comparison similarly invalid.

Stage I Survivals Not Evidence of Value of Early Treatment

The footnote to Table I in referring to the progression to "later stages" seems to imply compliance with the common concept that staging is a classification of duration. As has been shown previously (6, 8), this concept is largely fallacious. While it is self-evident that some time is required for any tumour to attain a large size, show fixation or other signs of infiltration and axillary involvement, matted or otherwise, it was established many years ago that the duration of a tumour does not necessarily bear any close relationship to its state; Deaver and MacFarland, in 1917, and probably many before emphasized that fact (9). In the well-known and oft-quoted report of the British Ministry of Health, 1926, Dr. Janet E. Lane-Claypon made the very definite statement that "There is no definite time relation between the stage and the duration of the disease in cancer of the breast." (10) And Nohrman, in his report from the Radiumhemmet, Stockholm, 1949, referring to a 2-stage classification (i.e. without and with proven axillary involvement), similarly points out that "Neither Stage I nor Stage II are, however, entirely homogeneous groups since both early and late cases are found in both stages." (11) As previously shown, too, the data for the Ontario clinics clearly and indubitably demonstrate the lack of any close relationship between duration and stage: in 1947, 53 per cent of "breast cancers" alleged to be less than 3 months' duration were classified in Stages other than I, while 55 per cent of those classified as Stage I were over 3 months' duration and 7 per cent over 2 years (5, 6). Further, Haagensen and Stout, in their comprehensive and objective study of 640 cases of breast cancer, found

that no less than 50 per cent of cases of less than 1 month's alleged duration had proven axillary metastases. They also found that 50 cases of alleged duration of less than 2 weeks, without distinction of axillary involvement, gave 54 per cent 5-year clinical cures, 50 cases of 2–4 weeks' duration, 34 per cent, and 100 cases of less than 1 month, 44 per cent (12). The contrast between these survivals, with very short pretreatment durations, and the 61 per cent in their axilla-free cases or the 80 per cent commonly reported for Stage I cases is sufficiently obvious and informative to require no comment. Thus, the attributes mentioned —larger size and, more particularly, fixation and axillary involvement, especially matted, on which, as shown in Table I, staging largely depends—are, though not exclusively, more fundamentally and more generally dependent on and more truly indicative of type* than of duration. Staging is, therefore, more a classification of type than of time. The survivals in cases classified as Stage I should not be misinterpreted or misconstrued as evidence of value of early treatment.

Indeed, frequent failure to discriminate clearly between type and time has accounted for many of the inconsistencies, complexities and even contradictions in breast cancer literature. Wider recognition and less disregard of the fact that staging is more an indication of type than of time and that type rather than time plays the predominant role in determining the outcome would do much to clarify what has become addled confusion in both thought and figures.

Summary

In a recent essay on the treatment of breast cancer the authors report a one hundred per cent increase in five-year survivals over those in untreated cases. They report 81 per cent survivals in Stage I cases.

Examination of the types of cases in the treated and untreated series indicates that the two series are not similar, the treated series containing a proportion of very favourable cases—"false positives," or lesions of very low lethal potentiality—that were not represented at all in the untreated series. Comparison, therefore, of the survivals in the two series is quite invalid and deductions drawn from such a comparison are similarly invalid. The conclusion that treatment gave a one hundred per cent increase in survivals must, therefore, be rejected as unproven.

As there is no close correlation between stage of the disease and duration, Stage I containing both early and late cases, and early cases including nearly all stages, it should not be inferred that the survivals in Stage I cases provide evidence of the value of early treatment. The high percentage of survivals in Stage I is explained by the type of lesion rather than by the time of treatment.

Frequent failure to discriminate clearly between type and time has accounted for many of the inconsistencies, complexities and even contradictions in breast-cancer literature. Wider recognition and less disregard of the fact that staging is more an indication of type than of time and that type rather than time plays the predominant role in determining the outcome would do much to clarify what has become addled confusion in both thought and figures.

**What part the tumour cell plays and what part the host in determining the lethality or lethal type of cancer has not, of course, been elucidated.*

As emphasized previously, recognition of the limitations of early treatment does not call for neglect of treatment. The objectives of treatment are not confined to preventing death or prolonging life. The other objectives, including mental and physical relief, as indicated by the authors, justify and require the best treatment possible. As there is no way today of distinguishing between the individual case in which early treatment *might* be of great significance and those cases in which its benefits are, by the inherent nature of the lesion, more limited, the best treatment requires that it be the earliest.

REFERENCES

1. Richards, Gordon E., Janes, Robert M., Peters, Vera, and Ash, Clifford: The Treatment of Carcinoma of the Breast. Essays in Surgery. Toronto: The University of Toronto Press, 1950, pp. 269–295.
2. Daland, Ernest M.: Untreated Cancer of the Breast. Surgery, Gyn. & Obs., 1927, *44*: 264.
3. Janes, R. M.: Carcinoma of the Breast. Canad. M. A. J., 1950, *62*: 14.
4. Bloodgood, J. C.: The Diagnosis of Early Breast Tumors. J.A.M.A., 1923, *81*: 876.
5. McKinnon, N. E.: Breast Cancer Mortality, Ontario, 1909–1947. Canad. J. Pub. Health, 1949, *40*: 257.
6. ——— Cancer Mortality Trends versus Clinical Claims of Cure. Unpublished.
7. ——— Cancer Mortality Trends under Different Control Programs. Canad. J. Pub. Health, 1950, *41*: 7.
8. ——— Cancer Mortality Trends in Different Countries. Canad. J. Pub. Health, 1950, *41*: 230.
9. Deaver, J. B., and MacFarland, J.: The Breast: Its Anomalies, Its Diseases, and Their Treatment. Philadelphia: P. Blakiston's Son & Co., 1917, p. 543.
10. Lane-Claypon, Janet E.: A Further Report on Cancer of the Breast, with Special Reference to its Associated Antecedent Conditions. Reports on Public Health and Medical Subjects, No. 32. London: Ministry of Health, 1926, p. 96.
11. Nohrman, B. A.: Cancer of the Breast—A Clinical Study of 1042 Cases Treated at Radiumhemmet 1936–1941. Acta Radiologica (Stockholm), 1949, Supplement LXXVII, p. 18.
12. Haagensen, C. D., and Stout, A. P.: Carcinoma of the Breast. Ann. Surg., 1942, *116*: 801.

Coordination in Nutrition Education

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BEFORE the problem of coordination itself can be considered satisfactorily, it might be well to consider briefly one or two of the more important problems that are encountered in a nutrition education program. The statement that "nutrition is accepted today as a vital part of any public health program" needs no defence. Because nutrition has become so vital a part of our public health program, it is quite apparent that nutrition education must be planned to move hand in hand with health education. It must not only be planned, therefore, for ready adaptation to the needs of the individual, but it must also be geared to follow any modern trend set by forward-looking public health personnel. At the same time it must allow for adaptation to the numerous modifications made necessary by research.

Public health concepts have changed to a marked degree in recent years. In its initial stages, public health education as such, received little, if any, attention. Today public health is concerned with a vastly different problem, the problem of reaching each individual with effective education, the problem of "motivating the individual so he will be willing, of informing him so he will be able, to do those things which will prove most valuable to his own wellbeing". Have nutrition education methods and concepts changed sufficiently to keep pace with these changes and growth in public health education? If nutrition education is to *remain* a vital part of the public health program, then changes and growth must constantly be required of it too. Are we succeeding, with our present methods of nutrition education, in bringing the individual to the place where he desires nutrition information, and then on to the point where he wishes to apply that information to his own advantage?

One of the most perplexing problems with which health educators are faced today is this task of developing in the individual himself a real concern in the question of health—and an understanding of the important part nutrition plays in relation to it. I am afraid the words "nutrition" and "nutrition education" do not appeal, by and large, to the general public today, to any startling degree. Certainly it behooves us to consider carefully new ways and means, and new approaches, to make nutrition education, not only more attractive and appealing but, most important of all, more effective.

If nutrition is accepted as a vital part of our public health program, what about the vital part of our nutrition education program? One vital and essential part of any such program is the firm personal conviction of each of those involved

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in health education, whether it be doctor, dentist, nurse, teacher or social worker. Each, too, must have an accurate nutrition concept, plus an understanding of the close relation which emotional and other factors bear to feeding problems. Could we say our nutrition education programs have always been sufficiently aware of these three requisites? The methods and concepts of many of our nutrition programs may have prompted an observation made recently by a well-known educator: "Vastly more effort has been devoted in the past to search for ways and means to make man learn what he doesn't want to learn than to study the reasons for his resistance."

In any discussion on nutrition the question of income invariably arises. Income is undoubtedly a determining factor in food choices, but it is encouraging to note experiments have shown that education exerts twice as much influence as does actual cash income. Adequate income is no guarantee that the nutritional status of the individual will be adequate. Income is important, but much more important are those factors which determine the way in which the income is spent, factors such as ignorance, carelessness, disinterest, food whims and modern-day over-indulgence.

Not long ago, in an article on nutrition education methods and motivation, the fact that we too frequently tend to discount these unseen, underlying obstacles that block changes in food attitudes and food practices, was brought rather forcibly to my attention by one sentence which read: "It is as easy to teach the child good Nutrition as it is to teach him Arithmetic—*if the learning situation is favorable.*"

Teaching the young child that 2 and 2 are 4 requires, it is true, motivation, practical application and drill along with careful teaching based on sound educational principles,—but it is a comparatively simple teaching situation. The child has come to this learning situation, in the first place, well conditioned. Two and 2 have always made 4. His parents, his brothers and sisters, and his playmates have always accepted it as a well proven, unalterable, undisputed fact. No parent—no matter how indulgent—would ever think of allowing the child to choose 3 as his answer to the problem, just because he dislikes making the figure 4, or because 3 is so much more convenient to make or easier to remember. No teacher is confused or uncertain about the fact. The problem is a simple, direct, straightforward teaching problem, and ample visual proof is at hand. There is no cause here for hesitation and uncertainty, no need to question which authority should be followed, the one which considers the answer to be 3.90 or the one who insists it must be considered to be 4.09. Radio and press, high-pressure salesmanship and glamorous advertising are not continually bombarding the child with promises of a new personality, a glamorous future or romance and riches if he will accept their answer to the sum as 3 or 5. When the child returns home, he finds that 2 and 2 make 4 at home just as it did in the classroom—and everyone bears witness to the fact: the doctor, the dentist, the school nurse, the teacher, parents, brothers and sisters, playmates, the school arithmetic and other text books, the radio, the press, the corner grocery store, the movies and the comic strip.

Nutrition education may no longer be considered to consist solely of the teaching of basic and fundamental food facts. Unfortunately there are other more complicated and difficult problems. There is, for example, the problem

of breaking down firmly established, unsatisfactory food patterns, patterns which were established in infancy and which are closely tied up with every factor that goes toward influencing the home and the child. Several other problems may be listed: combating high-pressure advertising and salesmanship; clarifying the essential basic facts; counteracting the false and misleading information that confronts us on so many sides; overcoming the confusion resulting from the discordant and misleading information which not only abounds in popular magazines but which also, unfortunately, frequently appears in our text books and other educational material—a confusion which results in that state of mind best described by the well-known quotation from Stephen Leacock, "Mounting his horse, he rode madly off in every direction."

These are all factors which combine to make the changing of food habits and food attitudes a very difficult and a very stubborn and complex problem. Even by the most optimistic, nutrition cannot be considered, however favorable the learning situation, to be easily taught. It is too closely tied up with the emotional as well as the physical setup of the home.

The more complex the problem, the greater the need to tap all available sources in an effort to find the most effective solution. This can be done only through coordinated efforts—coordination designed to bring together the various groups, agencies and personnel who are working toward a common goal, though through separate channels; coordination to establish a common objective toward which all may work together; coordinated effort to provide simple, definite educational material that will assist educators and public alike to avoid the confusion which results from contradictory statements. The effort should be planned to assist in any way possible all those organizations interested in improving the health of the individual. Needless duplication may thus be lessened and emphasis given to the importance of nutrition to health by such a repeated, continuing and concentrated effort. Coordination should be planned to provide opportunities for interchange of viewpoint and knowledge, of experience and training, and to allow for the consideration of all the many problems in the light of the scientific background of the doctor, the dentist, the pediatrician, the nutritionist, the social worker. Problems may be studied through the eyes of the educator, on the university, secondary, elementary or nursery school level, from the viewpoint of the parent, and from the aspect of the child himself, who is, after all, the focal point of a large percentage of present-day educational efforts.

Fortunately, when I speak of coordination such as this, I am not speaking idly of an idyllic situation which looks well on paper but which fails to work in practice. Actually, the points I have brought to your attention are those which have been in the minds of many of us in Toronto for some time, and which crystallized a little over a year ago in the formation of the Toronto Nutrition Committee. This committee, representative of all those interested in, and actively engaged in, the work of nutrition in Toronto, was formed at a most auspicious moment; fortunately it came into being co-incidentally with a similar group established on the provincial level, The Ontario Interdepartmental Nutrition Committee. Both these groups keep in close contact with each other, the Toronto Nutrition Committee being particularly fortunate in having as one of its members the chairman of the provincial group. As a result this

word "coordination" is not just a badly overworked word; it is, rather, a two-way reality, for not only has coordination of city personnel, facilities and services been established, but there is as well an excellent working relationship between the provincial and city groups.

The objective of the two committees this first year has been, by choice, identical, namely,—to improve the food habits of children. This does not mean that the program of nutrition education is restricted to children. We have accepted it as a family and group problem. The child, we know, is powerless to change many faulty food practices existing in an uncooperative home. Parents need to be educated at the same time, not only in what foods the child should eat but in their responsibility for the child's attitudes and for his food habits as well.

The educational program of both committees was developed around the same needs, those which were felt to be most urgent at that time: to improve the child's intake of milk, vitamin C and vitamin D and to discourage the use of sweet foods.

The educational material directed to parents, teachers, public health personnel and other groups, has been prepared to meet the approval and the wholehearted support of top-ranking medical, dental and nutritional authorities—and has been designed to tell exactly the same story in a simple, factual manner.

One can tell only by future developments how successful such an effort at coordination will be, but already high hopes are held that it will continue to prove to be a strong factor in the future health program of our city and province. It is felt, at the end of our first year, that excellent spade work has been done and that much has been accomplished. From the Nutrition Committee members' point of view, the contacts we have had with each other and the opportunities we have had to work together have been most stimulating and worthwhile. Very satisfying, too, has been the response this coordinated program has received from mothers' groups, Home and School Associations, and parent education and teachers' groups, while the opportunities that have been afforded us to work with these organizations throughout the city, and even beyond, have been most gratifying.

Both the Provincial and the Toronto Nutrition Committees plan to continue this coming year their coordinated effort to improve the food habits of children. The Toronto Nutrition Committee plans to follow the same general line of attack:

(1) To study the problems as a group, drawing upon the experience, training and knowledge of each committee member.

(2) To arouse the interest of city organizations and associations and to enlist their sympathy and support.

(3) To work through Home and School groups and public health and other organizations, coordinating our effort and concentrating on the most immediate and urgent needs, and—

(4) To tell the same story, clearly and simply.

Finally, may I refer once more to the simple mathematical problem which was used earlier as an illustration: Two and 2 do make 4. In a well-integrated, well-coordinated nutrition education program, however, 2 and 2, if placed side by side, may be made to equal not 4, but 22.

A New Salmonella Type: Salmonella montreal

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IN October, 1950, a Salmonella strain was isolated from the stool of a hospital nurse by J. M. Desranleau at the Laboratories of the Quebec Ministry of Health in Montreal. The culture was later forwarded to this laboratory for identification. Its cultural and biochemical reactions placed it in the genus Salmonella, but its antigenic structure indicated that it was a new type, for which the name *Salmonella montreal* is suggested.

Clinical History

The patient, Miss M. J. D., a nurse at St. Justine Hospital for Children, Montreal, visited Italy during the summer of 1950. The duration of her stay in Italy is rather indefinite. Two days after embarking from Cannes, France, by steamship on September 24th, she was taken ill and showed typical symptoms of gastroenteritis. Severe diarrhoea lasted twelve to fifteen days. On her arrival in Montreal, a stool specimen was taken and submitted for examination to the Quebec Ministry of Health Laboratories, where the culture was isolated.

Bacteriological Findings

The organism was a gram-negative, motile, short bacillus, with the typical biochemical reactions of the Salmonella group.

Biochemical Reactions

The organism fermented arabinose, dextrose, dulcitol, galactose, levulose, maltose, mannitol, mannose, rhamnose, sorbitol, trehalose and xylose, with the production of acid and gas in 24 hours. Dextrin showed a delayed fermentation, with acid and gas after five weeks. Adonitol, inositol, inulin, lactose, raffinose, salicin and sucrose were not fermented, while cellobiose and glycerol both showed delayed acid fermentation without gas. Indole was not produced. The Methyl Red Test was positive and acetylmethyl-carbinol was not produced. Urea was not attacked. Simmons citrate and d-tartrate were both utilized. H_2S was produced on Triple Sugar Iron Agar. Litmus milk turned acid in two weeks without clotting. Gelatine was not liquefied.

Serological Reactions

The organism was agglutinated to titre by *S.essen* (IV, XII; g,m −) O serum, while an O suspension of *S.essen* was agglutinated to titre by an antiserum prepared against *S.montreal*. The new type was not agglutinated by single

factor "I" or "V" O antisera. It was further demonstrated that absorption of *S.essen* O antiserum by *S.montreal* removed all O agglutinins for the homologous type, while *S.essen* was capable of removing all O agglutinins from *S.montreal* O antiserum. The somatic antigenic structure was thus established as IV, XII.

When first examined, the organism exhibited only one phase (later established as phase 2), but when cultured in the presence of an antiserum prepared against the antigens of this phase (l,w), the other phase readily appeared.

The new type was agglutinated to titre by *S.paratyphi B* var. *Java* (IV, V, XII; b −) H antiserum. *S.montreal* H antiserum was found to agglutinate *S.paratyphi B* var. *Java* to titre. Absorption of *S.paratyphi B* var. *Java* H antiserum with *S.montreal* completely removed all H agglutinins from that serum. Conversely, absorption of *S.montreal* phase 1 H antiserum with *S.paratyphi B* var. *Java* removed all H agglutinins for this phase.

Absorption of an antiserum prepared against phase 2 of *S.montreal* with *S.dar-es-salaam* (I, IX, XII; 1, w − e, n) in phase 1 removed all phase 2 agglutinins from the *S.montreal* serum. Reciprocal absorption of *S.dar-es-salaam* phase 1 serum with *S.montreal* in phase 2 showed complete removal of the "1, w" agglutinins. Thus "1, w" were established as the phase 2 antigens.

The antigenic structure, therefore, of the new type *"S.montreal"* is IV, XII; b − 1, w.

Summary

1. A new type of Salmonella, *Salmonella montreal,* isolated from the stool of a nurse suffering from gastroenteritis in October, 1950, is described.

2. The antigenic structure of the organism is IV, XII; b − 1, w.

3. The exact source of infection has not been determined.

Acknowledgment

The authors are grateful to Dr. G. Charest, Epidemiologist for the City of Montreal, for his efforts in collecting the clinical information on the case from which this organism was isolated.

Methods Used in the Province of Saskatchewan to Provide Vital-Statistics Information to Medical Officers of Health

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THE METHODS used in the Province of Saskatchewan to provide information about vital statistics to medical health officers in organized health regions, or to any other full-time medical health officer employed by an organized municipality, are basically those suggested in the paper that I presented to this section at the 1946 meeting in Quebec City.

During the fall of 1948 it was decided to conduct an experiment in Health Region No. 1, Swift Current, whereby all registrations of births, stillbirths, deaths and marriages occurring in the region were to be channelled by the division registrars concerned through the medical health officer of the region instead of directly to the Director of Vital Statistics. Health Region No. 1 covers an area of approximately 14,500 square miles and has a population of around 48,500. In this area there are 1 city, 6 towns, 36 villages and 35 rural municipalities or Local Improvement Districts. In accordance with The Vital Statistics Act, every city, town, village, rural municipality or Local Improvement District is a registration division, and we have in this health region a total of 78 registration divisions and the same number of division registrars.

The Vital Statistics Act at that time provided that division registrars should submit all registrations to the Director of Vital Statistics, and in order to conduct our experiment it was necessary for us to develop the scheme with the co-operation of the division registrars concerned. One of our inspectors of vital statistics visited all the division registrars to explain our objective, and as a result complete co-operation was received. Once this was accomplished, a directive circular was sent out by the Director informing all division registrars of the procedure to be followed in order that all registrations would be channelled to the medical health officer of their Health Region.

Prior to the commencement of this method, provision was made for a statistical clerk on the Health Region staff. The clerk was given two months' training in the Division of Vital Statistics on the methods of handling registrations and the ways and means of retaining for the Health Region's use information contained on original registrations. Particular emphasis was placed on the importance of clearing original registrations to the Division of Vital Statistics

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with the least possible delay. A card system for retaining vital statistics data in the Health Region files was introduced. These statistical cards are made out just as soon as possible from the original registrations and the original registration is cleared with a report form to the Director of Vital Statistics. The birth card is of particular interest since not only a statistical card but also an infant and pre-school record report form are created in the same operation. The form is constructed so that the top part becomes the infant and pre-school form and the second part the statistical card for the birth. The top part is detached and sent to the public health nurse in whose district the mother resides and the second part is retained as a statistical card for the information of the medical health officer.

All registrations are checked for completeness. If a record is found to be incomplete, an enquiry is made at the Health Region level and a copy of the query is forwarded, with the registration concerned, to the Vital Statistics office, where the registration is held until the required information is received; any further correspondence on the subject is carried on by the vital statistics office. Causes of death are also carefully scrutinized by the medical health officer. If necessary, he contacts the physician to obtain additional information so that the cause of death can be properly classified.

The experiment conducted in the Health Region of Swift Current proved so successful that similar arrangements have now been made in three more organized health regions—Health Region No. 6, Moose Jaw; Health Region No. 3, Weyburn; and Health Region No. 13, North Battleford. The structure of these health regions is very similar to that of Health Region No. 1, Swift Current, and the same methods are used.

Our method for organized individual municipalities such as the cities of Saskatoon and Regina, which employ a full-time medical health officer but are not included in any organized health region, is similar in principle but sufficiently different to warrant a brief explanation.

The Vital Statistics Act in our province provides that every secretary-treasurer or city clerk, or such other person as may be approved by the Lieutenant-Governor-in-Council, shall be the division registrar. Under these provisions and at the request of the municipal authorities, the medical health officer has been appointed as division registrar. This means that all registrations are automatically channelled through him, and copies of the original registrations are kept in his office, from which any information required can be obtained.

As a result of the methods used in our province, the registration of events occurring in 6 cities, 23 towns, 135 villages and 126 rural municipalities or Local Improvement Districts are now being channelled through the medical health officers of the areas concerned. In addition to this, the Vital Statistics office prepares and forwards to the medical health officer statistical cards for any event which occurs outside a health region but involves residents of the region. In Saskatchewan at the present time, therefore, approximately 45 per cent of the births, 49 per cent of the deaths, 41 per cent of the stillbirths, and 47 per cent of the marriages occurring in the Province are now being channelled through medical health officers before they reach the Vital Statistics office.

Coxsackie Virus in Urban Sewage*

Recovery of Virus in Season of Low Incidence of Reported Poliomyelitis

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DURING the past two years we have made examinations at regular intervals for the presence of poliomyelitis virus in Toronto sewage, and a report describing our findings between December 1948 and December 1949 has been published (1). In brief, the virus was recovered from sewage during the peak of the "poliomyelitis season", but was also isolated some weeks before the first reported case. Our studies have continued during 1950, and in the month of January were extended to include examinations for the presence of Coxsackie virus, because another group recovered this agent from sewage collected in 1948 in Connecticut and North Carolina (2, 3, 4).

We have previously reported that Coxsackie virus was isolated from cases of nervous disease in Ontario, including Toronto, in 1949 (5, 6), and tests now in progress show that this virus was again prevalent in 1950.

This preliminary communication records the isolation of Coxsackie virus from the sewage of a residential section of Toronto in the summer of 1950, a period when very little clinical poliomyelitis was being reported.

Probable Incidence of Poliomyelitis and Coxsackie Infections During Period of Study

The year 1950 was one in which the number of reported cases of poliomyelitis in Toronto was very low. The monthly incidence of reported cases occurring in that portion of the city and nearby municipalities connected to the North Toronto Sewage Treatment Plant is shown in Table I.

It is not possible to give any indication as to the likely frequency of Coxsackie infections in this part of the city during the period of study, for the virus has been incriminated in such diverse conditions as "aseptic" meningitis, "influenza", summer grippe, short-term fevers, and "minor illnesses". Although cases of aseptic meningitis would probably be reported as suffering from non-paralytic poliomyelitis, none of the other conditions would be considered as reportable.

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TABLE I

REPORTED CASES OF "POLIOMYELITIS" IN TORONTO AND ADJACENT AREAS CONNECTED TO NORTHERN TREATMENT PLANT, SUMMER AND FALL 1950

Month in which Illness Commenced	Number of Reported Cases	
	Non-paralytic	Paralytic
June	0	0
July	1	0
August	1	1
September	1	1
October	0	0
Total	3	2

COLLECTION OF SAMPLES

Samples have been taken at intervals of approximately 3 weeks, since the end of the period covered by our last report, from the Northern Treatment Plant. This plant serves a residential, largely suburban section of Toronto and some homes in surrounding municipalities. The only hospital in the area is one for veterans. The main city hospitals, general, pediatric, and isolation, are not connected to this plant. Accordingly, samples from this Northern Plant represent material excreted by city residents. As before, sewage was collected in 4-litre bottles or jugs on 3 or more usually 4 successive days, material obtained at 8 a.m., 12 noon and 4 p.m. being pooled to give the sample for the day. This report relates in particular to samples collected from the end of May to early October 1950.

PREPARATION OF SEWAGE FOR INOCULATION

The methods of ether treatment or precipitation with ammonium sulphate have already been described (1).

This year, in addition, we have concentrated many samples by ultracentrifugation in the "Spinco" ultracentrifuge (Specialized Instruments Corp., Belmont, Calif.). Generally, about 50 ml. of sewage were removed from each bottle and pooled. This material was then centrifuged at 4,000 r.p.m. for 1 hour on a horizontal centrifuge in the cold-room. The deposit of this low-speed centrifugation, which might be expected to contain some virus, was saved for treatment with ether. The supernatatant was then distributed to ultracentrifuge tubes and centrifuged in the Spinco rotor "D" for 1 hour at 39,460 r.p.m. (115,000 times gravity). The supernatant fluids from each tube were removed and all the deposits taken up in not more than a total volume of 2 ml. of sterile saline. The resuspended deposits were then treated on three occasions with ether. If this treatment failed to render the material bacteria-free, 1,000 units of penicillin and 0.5 mg. of streptomycin per ml. were added.

Suckling and adult mice as well as monkeys were inoculated with the ultracentrifuge deposits. The deposit from the low-speed centrifugation and the supernatant from ultracentrifugation were pooled and rendered bacteria-free by ether treatment and antibiotics; this material was inoculated in monkeys peritoneally.

Inoculation of Animals

Suckling mice were inoculated cerebrally with 0.03 ml. of ultracentrifuged deposit. They were examined daily, and at the first sign of illness were sacrificed. The brain was removed to formalin fixative, and the remainder of the body was placed in Zenker's fluid, the anterior thoracic and abdominal walls being opened to allow the fixative to penetrate. Diagnosis of Coxsackie infection was based on the characteristic histological picture in muscles and other organs (7).

Rhesus monkeys were inoculated cerebrally (0.8 ml. thalamically) and additional material was inoculated peritoneally. The animals were killed after 4 weeks and brain and cord examined histologically.

Results

Virus Isolations

No poliomyelitis virus has been recovered in 1950 from any sample so far tested, but Coxsackie virus was isolated from sample 27 collected on June 26,

TABLE II

Results of Examination of Toronto Sewage for Poliomyelitis and Coxsackie Viruses, Summer 1950

Serial Number of Sewage	Date of Collection	Method of Preparation of Inoculum	Inoculation of Suckling Mice		Result of Inoculation of Monkeys
			Age of Mouse	Result	
25	May 29, 30, 31 June 1, 1950	Ultracentrifugation	4 days	Negative	#776 –
26	June 12, 13, 14 and 15, 1950	Ultracentrifugation	2 days	Negative	#770 –
27	June 26, 27, 28 and 29, 1950	Ether treatment			#789 –
		Ultracentrifugation	3 days	Positive	
28	July 17, 18, 19 and 20, 1950	Ether treatment			#790 –
		Ammonium sulphate			#791 –
		Ultracentrifugation	3 days	Negative	#771 –
29	August 7, 8, 9 and 10, 1950	Ether treatment			#779 –
		Ammonium sulphate			#778 –
		Ultracentrifugation	3 days	Negative	
30	August 22, 23, 24 and 25, 1950	Ammonium sulphate			#855 –
		Ultracentrifugation			#780 –
31	Sept. 11, 12 and 13, 1950	Ammonium sulphate			#854 –
		Ultracentrifugation	2 days	Positive	#853 –
33	Oct. 2, 3, 4 and 5, 1950	Ammonium sulphate			#852 –
		Ultracentrifugation	3 days	Negative	#856 –

27, 28 and 29 and sample 31 collected on September 11, 12 and 13. These strains of Coxsackie virus do not infect adult mice by the cerebral route and have been passaged in suckling mice with a view to antigenic typing at a later date. The results of the examinations are shown in Table II.

Histology of Suckling Mice

Microscopic preparations were made of representative areas from all parts of the carcass. The lesions were diffuse and limited to the skeletal muscles, with the notable exception of the tongue, which was not involved. There were no changes in the viscera, smooth muscle, fat, or central nervous system. The reaction seemed to be somewhat more intense in the limbs, but this might be more apparent than real because of the greater mass of muscle tissue.

The most striking histological changes in the skeletal muscle were the swelling and waxy or hyaline degeneration of the sarcoplasm and loss of transverse striations. The hyalinized muscle fibres showed varying degrees of fragmentation and dissolution. Concomitant with the disappearance of the sarcoplasm there was swelling and proliferation of the sarcolemma sheaths with occasional mitotic figures. The muscles were edematous and there was a scanty infiltration with polymorphs.

The microscopic lesions occurring in suckling mice as the result of inoculation with extracts of sewage were essentially similar to those produced by strains of Coxsackie virus previously isolated in these laboratories from stools (5, 6).

Discussion

The recovery of Coxsackie virus from samples of urban sewage obtained from a plant serving a residential area suggests that considerable numbers of persons must have been excreting this virus. As very few cases of poliomyelitis were reported at the time, it would appear probable that the virus was being excreted by persons suffering from other clinical syndromes or by healthy carriers.

It is of interest that Coxsackie virus was recovered from sewage by the technique of ultracentrifugation. We have previously shown that poliomyelitis virus can be isolated from artificially infected river water by the same technique (8), and it seems reasonable to suggest that this virus could also be isolated from naturally infected sewage by similar methods.

Summary

1. Coxsackie virus has been recovered from 2 samples of sewage collected at a plant serving a residential area of Toronto.
2. The samples were collected in the summer of 1950, a season when less than 10 cases of poliomyelitis were reported in the area served by the sewage plant in question.
3. No poliomyelitis virus was isolated from any sample collected during this season.
4. The Coxsackie virus was demonstrated in material prepared by ultracentrifugation, and it is probable that the method used would also serve to concentrate poliomyelitis virus.

5. Pending cross-neutralization tests with immune sera, the virus has been tentatively identified as belonging to Dalldorf's Group A, as it produces characteristic myositis in suckling mice without notable lesions elsewhere.

ACKNOWLEDGMENTS

Our thanks are due to Mr. L. J. Bonham, who has supervised the collection of the samples, and to the Commissioner of Works, City of Toronto, for continuing to place facilities for sewage collection at our disposal. The help of the Medical Officers of Health for Toronto, North York, and Leaside with regard to furnishing details of reported cases of poliomyelitis is gratefully acknowledged.

REFERENCES

1. Rhodes, A. J., Clark, E. M., Knowles, D. S., Shimada, F., Goodfellow, A. M., Ritchie, R. C., and Donohue, W. L.: *Canad. J. Pub. Health,* 1950, *41*: 248.
2. Melnick, L., Shaw, E. W., and Curnen, E. C.: *Proc. Soc. Exp. Biol. Med.,* 1949, *71:* 344.
3. Curnen, E. C., Shaw, E. W., and Melnick, J. L.: *J.A.M.A.,* 1949, *141*: 894.
4. Melnick, J. L.: *Bull. N. Y. Acad. Med.,* 1950, *26*: 342.
5. Armstrong, M. P., Wilson, F. H., McLean, W. J., Silverthorne, N., Clark, E. M., Rhodes, A. J., Knowles, D. S., Ritchie, R. C., and Donohue, W. L.: *Canad. J. Pub. Health,* 1950, *41*: 51.
6. Rhodes, A. J., Clark, E. M., Knowles, D. S., Shimada, F. T., Ritchie, R. C., Donohue, W. L., Armstrong, M. P., Wilson, F. H., McLean, W. J., and Silverthorne, N.: *Canad. J. Pub. Health,* 1950, *41*: 183.
7. Pappenheimer, A. M., Daniels, J. B., Cheever, F. S., and Weller, T. H.: *J. Exp. Med.,* 1950, *92*: 169.
8. Rhodes, A. J., Clark, E. M., Knowles, D. S., Goodfellow, A. M., and Donohue, W. L.: *Canad. J. Pub. Health,* 1950, *41*: 146.

Canadian Journal of Public Health

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FLUORIDATION OF PUBLIC WATER SUPPLIES

IT IS GENERALLY ACCEPTED, as a result of studies in different parts of the world, that the use of drinking water treated with fluoride during the formative period of the teeth is associated with a substantial reduction in dental caries. It is further known that an excess of fluorine—above 1 to 1.5 p.p.m.—results in the mottling of tooth enamel. The general opinion is that an amount of 1 p.p.m. in drinking water is well within the limits of safety and is an optimal concentration for caries control.

In 1945 several studies to determine the value of this measure were started in the United States and Canada. These included the Southbury Training School in Connecticut and the municipal supplies of Newburgh, New York; Evanston, Illinois; Grand Rapids, Michigan; and Brantford, Ontario. For comparison with the findings in Grand Rapids, observations were made in Aurora, Illinois, where the natural supply is high in fluorine. The most recent report on the experiment in Grand Rapids shows a reduction of more than 50 per cent in six- and seven-year-olds and of more than 25 per cent in children over seven years, when compared with observations made in 1944-45, before fluoridation. The reduction was most pronounced in the young age groups, whose dentition was largely calcified, when 1 p.p.m. of fluoride was added to the previously fluoride-free public water supply. Sufficient time has not elapsed to evaluate the results in the older age groups.

An *interim* report of the findings in Brantford, Ontario, after five years of water treatment with fluoride, is presented in this issue. The health authorities achieved for that city an enviable reputation in diphtheria control; for twenty years Brantford, with a population of 36,500, has not had a reported case of diphtheria. Now it is the first city in Canada to give a community-wide trial of fluoridation of water. The results of the five years' experience give promise of a substantial reduction in tooth decay in the young age groups.

The work in Brantford is being followed with great interest by Dr. H. K. Brown, Chief Dental Officer in the Department of National Health and Welfare, and by Dr. F. Kohli, Director of Dental Services in the Department of Health of Ontario. Dr. Brown has undertaken a long-range comparative study of dental

conditions in Brantford, Sarnia, and Stratford. In Sarnia a group of 1,800 children is being studied as a control. The findings indicate that there is substantially less decay in the permanent teeth in the age group 6-14 years in Stratford, where fluorine occurs naturally in the water supply, than in Sarnia, where no fluorine is present. As part of a program of studies being conducted by the Faculty of Dentistry, University of Toronto, and the Department of Health of Ontario, first measurements of gingivitis are being made in Brantford children, and the findings will be compared with those in other communities. Gingivitis is responsible for the loss of as many teeth as decay.

There has been a rapid extension of the use of fluorine in water supplies, as is evidenced by the fact that in Wisconsin twenty-seven cities are now fluoridating their supplies and more than twenty others have begun to install equipment. There is a wide interest in this procedure throughout the United States. Recently, the American Dental Association, at its annual meeting, approved of fluoridation when required, basing its decision on the rapidly accumulating data. The Association has emphasized that the procedure is a partial protection against tooth decay and considers that it is an important step in the profession's fight against dental disease.

The possible effects of fluorine on health have yet to be fully investigated. One aspect, the effect of fluorine, manganese, cobalt, zinc, boron, and other trace elements on nutrition, is being studied in research institutions. McClure, in a recent study, states: "Our present knowledge does not permit classification of fluorine as an essential element in human nutrition even as regards dental health. The presence of fluorine in dental tissue or in other body tissues is not evidence that fluorine is essential." Although large populations living in communities where there is an abnormally high content of fluorine do not appear to evidence ill effects, apart from a high incidence of mottled enamel, the indiscriminate use of fluorine is not wise with our present limited knowledge. It is too soon to evaluate fully the results in Brantford, as the final survey will not be made until 1957, but studies such as the one being conducted in that city will be the basis on which the real value of this procedure will be determined. Public health authorities across Canada will be grateful to Doctor Hutton and his associates for undertaking this important experiment.

A TRIBUTE TO DOCTOR B. C. KEEPING

IN THE PASSING of Doctor Benjamin C. Keeping, retired Chief Health Officer of the Province, Prince Edward Island has lost one of its most faithful servants and public health in Canada one of its pioneer leaders. The development of the public health department of Prince Edward Island has been intimately related to the work of Doctor Keeping.

The department dates back to 1931, when the Hon. W. P. J. MacMillan, M.D., was appointed the first Minister of Health and Dr. Keeping was named Chief Health Officer. Following the first World War, the Canadian Red Cross Society had established a public health nursing service on the Island, and this marked the introduction of organized child welfare work in the province. Shortly afterwards, an intensive tuberculosis control program was inaugurated under

the leadership of Dr. P. A. Creelman and with the support of the Canadian Life Insurance Officers Association, as part of the Maritime Tuberculosis Demonstration in which Dr. G. J. Wherrett gave most valuable direction. The need for a provincial department of health had long been felt, and before the conclusion of the Demonstration the Government announced that a department would be established. With Dr. MacMillan, Dr. Keeping organized a health program which is meeting the needs of the Province in a highly effective manner. In speaking of Dr. Keeping's contribution to the development of the department, Dr. MacMillan has stated:

"Dr. Ben Keeping was my Deputy Minister. The problems we tried to solve were many and difficult in the 'depression' years. He was my assistant and great friend. He was efficient and competent, most conscientious, and the soul of honor. I could not have wished for a better official or wiser counsellor. His record for over twenty years in the health department was one of careful administration and marked devotion to duty. . . . The history of medical progress in Prince Edward Island will accord him a high place as a great pioneer."

On the occasion of Dr. Keeping's retirement from the Dominion Council of Health, of which he was a member for nineteen years, his splendid work was the subject of a resolution, and in his absence, because of illness, a presentation was made to him through Dr. O. H. Curtis, the new Chief Health Officer of the province. Although Dr. Keeping had not been in good health for a number of years, he had continued his duties until last November. His death came suddenly on February 11th, at his home in Murray River.

NEWS

British Columbia

DURING MARCH a new medical health officer was appointed to the North Fraser Valley Health Unit. Dr. A. A. Larsen, a graduate of the University of Alberta, formerly of Nanaimo, succeeded Dr. R. T. M. Puddicombe as director of the unit. Dr. Puddicombe was transferred to the clinical staff of the Division of Tuberculosis Control.

GUEST SPEAKER at the annual Public Health Institute this year will be Dr. Harry Mustard. Dr. Mustard will deliver a series of seven lectures to the staff during the four-day conference. Among the other topics on the agenda are civilian defence, local health services, the welfare program, and mental hygiene. The Institute will be held from March 26th to March 29th in Victoria and will be attended by all Provincial public health personnel.

THE ANNUAL MEETING of the British Columbia Branch of the Canadian Institute of Sanitary Inspectors will be held again this year in Vancouver on March 30th, immediately following the Institute in Victoria. This meeting will be attended by all sanitary inspectors in British Columbia.

Alberta

MRS. J. C. SOMERVILLE, who took a course in public health nursing at the University of Toronto last year, is stationed at Plamondon.

MISS EULODIE BRIERE, a graduate of the St. Boniface Hospital, joined the District Nursing Service staff in September and is stationed at Vauxhall.

MRS. KATHERINE BAKER (née Oriold), a graduate of the Edmonton General Hospital, has returned to the staff and is stationed at Hilda.

MISS E. JONES, formerly of Bow Island, is now with the Wheatland Health Unit at Strathmore.

MISS E. CARVET is on leave of absence, taking the public health nursing course at the University of Toronto.

MISS S. B. FURGESON, a 1950 graduate of the University of Alberta, is stationed at Bow Island.

MISS ORA BOYD, graduate of the Archer Memorial Hospital at Lamont, relieved at Hilda during an outbreak of scarlet fever and is now stationed at Valleyfield.

MISS BEVERLY PACHAL, a graduate of St. Paul's Hospital, Saskatoon, is at Youngstown.

MISS VALERIE WHEELER, a graduate of the Calgary General Hospital who has done post-graduate work at the Ponoka Mental Hospital, is at New Brigden.

MISS MARJORIE MITCHELL and Miss M. T. Lefebvre, who recently completed the advanced course in obstetrics at the University of Alberta, are stationed at Mirror Landing and Hines Creek.

MISS LAURA M. ATTRUX, upon completion of the advanced course in obstetrics at the University of Alberta, has opened a new district at Slave Lake.

MISS JEAN HARRINGTON, a graduate of the Edmonton General Hospital, and Miss Philis Warner, a graduate of the Misericordia Hospital, Edmonton, joined the staff of the District Nursing Service in February.

MISS LOIS HAMMITT, a graduate of the Misericordia Hospital, Edmonton, joined the Service in March.

Manitoba

AN ADVISORY BOARD of eleven men and women was established to assist the voluntary aid group of the Selkirk Mental Hospital. The board will help by publicizing the work being done and by soliciting aid from service clubs in the city. The voluntary aid will carry on work similar to that of other hospital auxiliaries and will concentrate their efforts on recreation and education.

THE 1950 ANNUAL REPORT of the Sanatorium Board of Manitoba, submitted by Dr. E. L. Ross, medical director, shows that the tuberculosis death rate for 1950 was the lowest ever recorded. This death rate has decreased 50 per cent over the past ten years. In 23 municipalities in Manitoba no new cases were reported in the past two years.

MR. ALEX KAY has left the Swan Valley Health Unit to take up duties as sanitary

inspector for the St. James Health Unit. He has been replaced in Swan Valley by Mr. B. A. Stephens of Brandon.

THE HONOURABLE IVAN SCHULTZ, Minister of Health and Public Welfare, has agreed to release Mr. L. A. Kay on leave of absence, at the request of the National Defence Headquarters. Mr. Kay, director of public health engineering, will join the staff of the Works and Accommodations Branch of the Chief Engineering Office, Canadian Army. He will assume his duties March 15th, with the rank of lieutenant-colonel.

APPROVAL HAS BEEN RECEIVED from Ottawa for a four-day Sanitary Inspectors' Institute. The program, which will be held from March 13 to March 16, has been arranged by the Department of Health and Public Welfare, and the Department of University Extension and Adult Education. The lectures and demonstrations will be given at the Fort Garry site of the University of Manitoba. It is expected that sanitary inspectors from Provincial health units and from the City of Winnipeg Health Department will attend.

Ontario

DR. C. W. MACCHARLES has returned to his office as director and medical officer of health for the Northumberland and Durham Health Unit, with headquarters at Cobourg, Ontario. For the past year Dr. MacCharles has been on leave of absence, serving in Korea under the Executive Board of the United Nations International Children's Emergency Fund.

Nova Scotia

AN UNUSUAL OUTBREAK of infectious hepatitis occurred in the Halifax area during the winter months. A large number of cases occurred in the outlying parts of the city but very few of these were reported officially until some twenty nurses at the Children's Hospital developed the disease. Although this disease is not ordinarily regarded as particularly infectious, there was every evidence that a large outbreak was occurring. Due to the large number of nurses off duty, admissions to this hospital had to be restricted, nursing classes stopped and other measures taken to control the outbreak. After the first explosive outbreak in the hospital, very few new cases developed and only two or three cases developed among nurses in other hospitals. It is possible that the large amount of gamma globulin used may have assisted in controlling a further outbreak.

THIS PROVINCE was one of the early ones affected in the outbreak of influenza. Throat washings from cases established the fact early in the outbreak that we were dealing with the A prime virus apparently identical with that concerned in the European outbreak. Fortunately, the disease was relatively mild and few if any deaths were directly attributed to the influenza. Every effort was made to keep schools opened and in this most authorities were successful, except in cases where the teacher became ill and no substitutes were available.

BOOKS

The Burden of Diseases in the United States.

By Alfred E. Cohn and Claire Lingg. New York and Toronto: Oxford University Press, 1950. 129 pp.; charts in matching cover. $12.50.

IN THIS UNIQUE volume, with its accompanying charts, the authors have sought to determine the extent of the burden of disease in the United States and to look at the problem in other countries. They have attempted to present the changes in the behaviour of disease during the last hundred years and the changes in the age of those in the population who are stricken. The facts are set forth in graphic form, in charts, and complemented by a critical account of what the curves suggest. In speaking of the interpretation, they state: "We have discussed at some length the doubts of professional statisticians. We agree . . . that there is unanimity concerning the inadequacy of the data. . . . It is our obligation to use what there is to the limit it permits. We publish this book knowing well its unavoidable inadequacies. We have been moved to go forward nevertheless because we believe a beginning must be made in scrutini-

zing critically the vast amount of statistical information that lies frozen and uninterpreted in the archives and census bureaus."

Dr. Cohn is a physician whose life has been spent in research at the Rockefeller Institute. His field of investigation has been the physiological aspects of the circulatory diseases. He was consultant in cardiovascular diseases to the A.E.F. in the first world war. His collaborator, Miss Claire Lingg, was secretary to the former committee on research of the New York Heart Association.

As an introduction, reference is made to the changes in the international lists of causes of death as revised in 1900, 1920, 1930 and 1940. The value of statistical statements is briefly and effectively presented. The third chapter relates to population and the death rate, with a discussion of the leading causes of death, considering the factors of age, race and sex and the course of events in specific diseases. In the fourth chapter the shape of curves by diseases is discussed. This is followed by chapters on numerical changes in selected causes of death, morbidity and morbidity surveys. A summary completes the volume. In it the authors state: "The results of our study of the statistics of mortality are quite plain. We have used them, we have discussed their use, and we have not apologized for using them. No view of the burden of diseases in the country can be complete without taking into account both morbidity and mortality. They are interlocking phases of the ill-health of the nation. Ultimately, when recording the full natural history of each citizen has become established custom, information for any likely use will be available."

The volume is a notable work. It brings together a vast amount of statistical information and makes it readily available for study. The authors' discussion is most helpful. For convenience, five large charts are contained in a separate cover. Many of the graphs are in colour, and special credit is due Miss Emma G. Craig, who prepared them.

R. D. Defries

The National Health Service Acts, 1946 and 1949.

By J. A. Scott, D. J. B. Cooper and S. Scuffert. London: Eyre & Spottiswoode, 1950. 1192 pp. 55s. net.

THIS VALUABLE ADDITION to the libraries of those interested in medical care is described in the subtitle as ". . . the complete text of the Acts and of the Statutory Instruments, Rules and Orders made thereunder, fully annotated with an introductory explanation. . . ."

The introduction is brief, but includes the highlights of the related social insurance studies and programs, the proposals of the medical profession, the regional hospital surveys, and the important White Paper of the Coalition Government of 1944 (Cmd. 6502). The index is helpful and comprehensive.

This large volume was prepared primarily for British medical officers of health and others interested in the actual administration of the Service. By bringing together most of the regulations made under the Acts and the circular letters of the Ministry of Health with respect to the National Health Service, it provides an insight into the working of the Service that cannot otherwise be obtained.

Even the most enthusiastic student of the subject will use this volume primarily as a reference manual. It seems unfortunate that some items that will be out of date quickly, such as the names of the members of the regional hospital boards, could not have been omitted in favour of other items of more lasting interest, such as: the circular letter on the regional planning of consultant services*, the reports of the Spens' Committees on Remuneration, or more detail on cost estimates and official reports on the problems of financing the Service.

G. H. M. Hatcher

*Ministry of Health: "National Health Service: the development of consultant service." London, His Majesty's Stationery Office, 1949.

Practical Statistics in Health and Medical Work.

By Ruth Rice Puffer, Dr. P. H. [McGraw-Hill Series in Health Science, Amos Christie, M.D., Consulting Editor]. New York and Toronto: McGraw-Hill Book Company Incorporated, 1950. 238 + xiii pages. $4.90 in Canada.

THE PURPOSE of this book is to discuss the development and utilization of statistical data in health and medical work. The introductory chapters present a suitable background and the essentials of statistical

methodology to meet the requirements of medical officers of health, physicians, nurses, and other health and medical workers. The book is characterized by a simplicity of approach to the problem and by its direct and practical, relevant illustrations.

Thirteen chapters are included and these deal with such subject matter as the planning of programs, studies and experiments. Considerable emphasis is laid on defining objectives. The text attempts no discussion of statistical theory or the proof of any formula. This is not a weakness for it is not the function of this book to do other than deal with statistical procedures and principles. A feature of importance to the reader of this book is its carefully selected chapter bibliographies. These afford access to the original material to which attention is directed. The addition of a few representative charts would greatly improve Chapter 4 on "Presentation of Data".

The great virtue of Dr. Puffer's book lies in the examples taken from her own personal experience as Director of Statistical Services in the Tennessee Department of Public Health. These examples afford clear answers to the important questions which regularly confront the actual public health analyst. Dr. Puffer is to be congratulated on producing a practical book of striking simplicity and directness which contains many essentials on the applications of statistical methods required by medical officers of health and all other public health workers.

A. H. Sellers

Community Health Educator's Compendium of Knowledge.

By Clair E. Turner, Dr.P.H. St. Louis: The C. V. Mosby Company, 1951. 266 pp. $3.00.

THIS IS the most useful book on health education that I have read. It contains a tremendous amount of information on all phases of health education, yet it is concise and simple.

The author has had many years' experience in teaching in university schools of public health in the United States, with voluntary organizations, and more recently as consultant in health education to the World Health Organization.

The book is divided into three sections entitled *Basic Principles, Working with People,* and *Media of Group Communication.*

Basic Principles deals with the objectives and scope of health education: the nature of community health education and where it occurs, motivation and subject matter, the community health educator.

Working with People considers kinds of individual and group contacts, individual conferences, group thinking, meetings, community organization and campaigns.

The third section on group communication, comprising about half the text, discusses writing, speech, radio, newspapers, letters, still and motion pictures, and exhibits.

Community Health Educator's Compendium of Knowledge was prepared not only for official health agency workers but also for workers in voluntary agencies, Home and School Associations, and the agricultural extension worker. It provides answers to their common questions and a working guide for the promotion of better health in the local community. It could serve well as a classroom text.

C. E. Robinson

Recent Advances in Social Medicine.

By A. C. Stevenson, B.Sc., M.D., M.R.C.O., D.P.H. London: J. & A. Churchill Ltd., 104 Gloucester Place, W. 1, 1950. 241 pp.

THIS IS A volume of 241 pages in which the author has not attempted to cover the entire field of social medicine but has made an arbitrary selection of topics. In this way he has made a more detailed presentation of the subjects chosen. The material is up-to-date and deals with child hygiene, school medical inspection, some applications of statistical methods, psychosomatic illness, the adolescent in industry, and a discussion of "Pulheems".

While the volume is of interest to any student of social medicine, it would appeal strongly to those studying for a diploma in child health and to medical officers of health. It is written in a refreshing vein.

M. H. Brown

BOOKS RECEIVED

Cancer as I See It. By Henry W. Abelmann, M.D. New York: Philosophical Library, 1951. 100 pp. $2.75.

Microbiology—General and Applied. By William Bowen Sarles, William Carroll

Frazier, Joe Bransford Wilson, and Stanley Glenn Knight. New York: Harper & Brothers, 1951. 493 pp. $4.50.

The Sanitary Inspector's Handbook. By Henry H. Clay, F.R.San.I., F.I.S.E. 7th ed., revised and enlarged. London: H. K. Lewis & Co. Ltd., 1950. 565 pp. 25s. net.

Bacterial Polysaccharides. By Martin Burger. Springfield, Illinois: Charles C Thomas, 1951. Canadian agents: The Ryerson Press, Toronto. 272 pp. $7.25 in Canada.

Practical Food Inspection. Vol. I—Meat Inspection. By C. R. A. Martin. London: H. K. Lewis & Co. Ltd., 1950. 322 pp. 18s. net.

Practical Food Inspection. Vol. II—Fish, Poultry and Other Foods. By C. R. A. Martin. London: H. K. Lewis & Co. Ltd., 1950. 308 pp. 18s. net.

Public Health Engineering. By Earle B. Phelps. Volume II. With Walter D. Tiedeman. New York: John Wiley & Sons, Inc., 1950. 213 pp. $4.00.

Diagnostic Procedures and Reagents. 3rd ed. New York: The American Public Health Association, Inc., 1950. 589 pp. $6.00.

The Community and Public Health Nursing. By Edith Wensley. New York: The Macmillan Company, 1950. Toronto: The Macmillan Company of Canada Limited. 250 pp. $3.50 in Canada.

The Rhesus Danger. By R. N. C. McCurdy, M.B., Ch.B., D.P.H. London: William Heinemann Medical Books Ltd., 1950. 138 pp. 5s. net.

Vocational Rehabilitation of Psychiatric Patients. By Thomas A. C. Rennie, M.D., Temple Burling, M.D., and Luther E. Woodward, Ph.D. New York: The Commonwealth Fund, 1950. 133 pp. 75 cents.

EMPLOYMENT SERVICE

Advertisements regarding "positions available" and "personnel available" will be published in from one to four consecutive issues, depending upon the requirements of the agency or person concerned. They are limited to seventy words or less, with a confidential box number if desired. There is no charge for this service to members of the Association. Health agencies are charged a flat rate of $10.00 for the advertisements (up to four consecutive issues) and for the service. The rate for non-members is $5.00. The service includes confidential clearing of information between prospective employer and employee if desired.

Sanitary Inspector: Applications are invited from qualified sanitary inspectors for appointment to the Kent County Health Unit which is carrying out a generalized program in southwestern Ontario. Initial salary will be based on experience and qualifications. Liberal car allowance, cumulative sick leave. Apply to Dr. D. C. Smith, Kent County Health Unit, County Building, Chatham, Ontario. 1/

Physicians Wanted: Applications are invited for posts with the Canadian Red Cross Blood Transfusion Service from registered medical practitioners with training in bacteriology or clinical pathology. Administrative experience desirable. All posts carry participating pension, hospitalization, medical services and group life insurance plans. Application forms and full details available from National Commissioner, Canadian Red Cross Society, 95 Wellesley Street, Toronto.

Industrial Nurse: The Bell Telephone Company of Canada requires a bilingual public-health trained nurse for the Laurentian District. Nurse would have her headquarters at Three Rivers. Position available immediately. Please address written applications to Nursing Supervisor, Room 930, 1050 Beaver Hall Hill, Montreal, stating qualifications and experience.

Wanted: Assistant Medical Officer of Health for the City of Ottawa. Salary range $5,520 to $6,480. Write to Dr. J. J. Day, M.O.H., City Hall, Ottawa, Ontario.

Medical Officer of Health required for the City of Westmount, Quebec. Generalized public health program. Letters of inquiry requesting details may be forwarded to Mr. N. T. Dawe, Personnel Officer, Westmount City Hall, 4333 Sherbrooke Street, Westmount 6, Quebec. 2/

Wanted: Public Health Nurse: The Elgin - St. Thomas Health Unit invites applications for the position of staff nurse. The present minimum salary is $1,900.00 plus cost-of-living bonus of $180.00 a year. Suitable adjustments will be made in salary for experience to a maximum salary of $2,600.00 and cost-of-living bonus. Car allowance $720.00 per year. Four weeks' vacation, cumulative sick leave at the rate of 1½ days per month unexpended up to ninety days, admission to pension plan after one year's service, and interest-free loan, if necessary, for purchase of car. Apply Supervisor of Nurses, City Hall, St. Thomas, Ontario.

Wanted: Qualified Sanitary Inspector—C.S.I.(C.); must be bilingual. Salary according to experience. Eight cents a mile travelling allowance. Blue Cross Hospital Plan. Apply to: Dr. P. A. Belanger, Director, Prescott and Russell Health Unit, Hawkesbury, Ontario.